

## REFERENCES

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*Biological Diversity of Mexico: Origins and Distribution*. Edited by T. P. RAMAMOORTHY, ROBERT BYE, ANTONIO LOT and JOHN FA. 1993. Oxford University Press, New York. xxxix plus 812 pp. Hardcover, \$79.95, ISBN 0-19-506674-X.

The introduction of this volume describes Mexico as the only “megadiversity” country, which is also a center of agricultural origin. With about 30,000 plant species, 1000 bird species and more than 2000 fish species, it is timely to compile at least part of the knowledge accumulated on the origin and distribution of the Mexican biodiversity.

This book is the result of a symposium on Biological Diversity of Mexico held in 1988. A large part of the biological community in Mexico and elsewhere joined in this immense effort. Twenty six chapters are divided into six main topics: historical background, description and discussion of selected faunistic groups and floristic groups (these two parts comprising more than half of the book), a section on phytogeography of selected vegetation types, one on plant diversity and humans, and finally, a review of terrestrial habitats. As in any edited book, that includes chapters produced by different authors, there is heterogeneity in quality, depth and subject matter.

The introduction to the book stresses the large number of species in the different groups encountered in Mexico and the urgent need to conserve habitats, by achieving a balance between human needs and the maintenance of biological diversity. The section on historical background starts with a description of the geology of Mexico. For the first time, a physiographic characterization is presented in association with the geologic description of the morphotectonic provinces of Mexico. Although some of the terms used may be too technical for many biologists, this chapter is a valuable source of relevant references on the geology of a particular area. The next chapter on the historical factors and the biological diversity in Mexico is a concise and well-integrated account of the different elements that have contributed to the high diversity in this country. The last chapter in this section discusses the diversity and origins of the phanerogamic flora of Mexico. Rzedowski estimates the total number of angiosperm species to be 21,600 based on the species/genera ratio of the Compositae. Data of local floras show that this ratio has a parallel with the species/genera ratio of the whole phanerogamic flora (in latitudes close to Mexico). Knowing the number of total angiosperm genera in Mexico, the number of species is estimated based on the Compositae species/genera ratio. Although interesting, this empirical relationship between ratios requires at least a hypothetical explanation to convince skeptical readers. The experienced author makes clear that the geographical distribution of endemisms does not follow the same patterns as those of diversity, which is corroborated by the evidence presented in the rest of the book.

The next section presents seven chapters on selected faunistic groups of Mexico. The chapter on native bees of Mexico is noteworthy. It goes beyond a general account of bee distribution and links the biodiversity observed with expected biogeographic patterns. A compilation of all the species recorded in Mexico is followed by a dis-

cussion of some problems detected in the collections, like the fact that they are restricted to certain seasons. Interestingly, the authors note that the diversity of bees in a region is normally well represented at specific localities, hence, intensive rather than extensive studies are recommended.

The chapter on herpetofauna of Mexico includes a brief and interesting comparison of the distribution of reptiles and amphibians in Mexico and the rest of the world. A laudable effort is made in presenting information on fossils known in this group and their correspondence with present herpetofauna. As interesting as the report on herpetofauna is the geographic, ecological and historical analysis of land bird diversity. Unweighted pair-group method analysis is used in this chapter to explain avifaunal similarity among geographic regions in Mexico. This report explains how patterns of diversity do not match patterns of endemism.

Patterns of mammalian diversity in Mexico are presented as the last chapter in this section. Mexico is reported as departing from the species-area relationship observed in mammals, indicating more mammalian species than expected based on its area. It should be noted, however, that this departure is not exclusive to Mexico, as the figure presented clearly shows. It is however refreshing to see that this comparison includes many countries, since most of the chapters compare number of species in Mexico with the number in the temperate United States or the smaller Central American countries. The conclusions reached for the patterns observed for the mammals are compared with other groups, like the amphibians, reptiles and birds, thus establishing a connection with previous chapters.

The third section in the book on selected floristic groups includes eleven chapters, starting with the diversity in the bryoflora. In spite of the scarce information available on this group, the author presents a clear idea on the origins and distribution of mosses. An important genus in Mexico: *Pinus*, is the topic covered by Styles. A clear taxonomic description is followed by a discussion on efforts geared to pine forest conservation. Also a clear taxonomic presentation as well as the first cladogram in the book is found in the report on Commelinaceae of Mexico, where karyotypic information is used to infer evolutionary dispersal. Phylogenetic relationships are also discussed in the reports on Lamiaceae and Acanthaceae. In many chapters in the book, appendices on recent literature provide interested students of the group with useful references.

The genus *Quercus* is discussed in an interesting chapter. Due to the problem presented by the use of the biological species concept in this genus rich in hybrids, the concept of phylogenetic species is used. This revision includes a discussion on fossils and biogeographic patterns. Sousa and Delgado provide a very thorough and original presentation on the Leguminosae. They divide this huge family into artificial groups according to the level of endemism. Each group is presented by discussing the distribution and origin of a few well-studied genera. An interesting account on the possible routes of migration is presented. The last chapter in this section discusses the diversity of the Mexican aquatic vascular plant flora. Due to the polyphyletic nature of this group, the emphasis given is more ecological than evolutionary.

The fourth section on phytogeography of selected vegetation types in Mexico starts with a brilliant and innovative discussion on the composition, affinities and origins of the canopy tree flora of the Atlantic rain forests. A rigorous review of recent paleofloristic data is used to shed light on the origin of the canopy flora, giving a new perspective on migration routes. This study estimates the Laurasian contribution to this flora to be at least 25%, a figure which indicates a larger ancient component of the flora than scientists have previously surmised. The second and last chapter in this section discusses the phytogeography and history of the alpine-subalpine floras of northeastern Mexico. McDonald gives a clear descriptive account of the history of this flora based on its more widespread distribution during the Wisconsin glacial, and the subsequent climatic changes that left this flora as insular refugia. He uses similarity indices to compare the affinity of this flora with that of the Rocky Mountains

and that of the Trans Mexican Volcanic Belt, concluding that the similarity is higher with the former.

The fifth section in the book on plant diversity and humans includes two chapters. The first discusses the role of humans in the diversification of plants in Mexico. Interesting concepts are presented in this chapter, such as the study of possible correlations of cultural richness with species richness. The second and last chapter of this section presents the view of Hernández Xolocotzi on some aspects of plant domestication in Mexico. This presentation touches on the origin and evolution of some cultivars through the history of Mexico, effects and perceptions of occidental science and traditional agriculture, and methods to conserve this diversity. An appendix on representative plants domesticated in Mexico is an excellent addition to this chapter.

Finally, the last section presents a clearly written review of terrestrial habitats. Toledo and Ordóñez set the ground for conservation measures, since they provide information on biological richness and endemism together with the prominent land uses in six terrestrial habitats well represented in the country. In this manner, the status of knowledge of biodiversity presented in the previous sections is united with the information on human activities in the areas where this diversity occurs.

Although few typographical errors are found in the book, a criterion on the use of accents in Spanish is lacking. More disturbing are the maps presented, where details are impossible to read.

There is no doubt that this book is overall well conceived and executed. It is a solid step towards the presentation of accumulated knowledge of the Mexican biodiversity. Anybody interested in the ecology, taxonomy, evolution, conservation or biogeography of the Mexican biota should have this volume at hand. We can only hope that the example set by this volume will be followed by future productions of equal quality. It is evident throughout this book that a lot is known about the biodiversity of Mexico, but a long path still lays ahead of us; the ignorance in many groups is vast. This book reveals that areas of richness and endemism for one group do not always coincide with that of others. Declaring all the areas of richness and endemism of every group as protected would be impossible. Greater understanding of biodiversity and of its interaction with humans can only help in the search of the balance of human needs and maintenance of biodiversity in this fascinating country.

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*Giant Sequoia Groves of the Sierra Nevada: A Reference Guide.* By DWIGHT WILLARD. 1994. Self-published. P.O. Box 7304, Berkeley, California 94707. 372 pages.

This reference book on giant sequoia (*Sequoiadendron giganteum*) groves came about because in Dwight Willard's words, "I love sequoias." Relying on other reference materials, interviews, and personal visits to groves, Willard provides detailed information on 65 separate groves, emphasizing giant sequoia resources (location, grove characteristics, human use patterns, etc.) and natural values (noted/named trees, "other" forest, and water resources nearby). He also provides selected comments on fire history, management and research needs, and bibliographic references. Most grove descriptions are about 3½ pages long, with 12 pages in the book devoted to low quality xerox copies of USDA Forest Service or USGS quadrangle maps that show grove locations.